

## AUTO-VERIFYING VOTING SYSTEM AND VOTING METHOD

The inventors are the applicants, Michael R. McDermott and Anthony I. Provitola, citizens of the United States of America whose residences are DeLand, Florida, U.S.A.

## CROSS-REFERENCE TO RELATED APPLICATIONS

Not Applicable

## STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable

## REFERENCE TO MICROFICHE APPENDIX

Not Applicable

## BACKGROUND OF THE INVENTION

Current mechanical and electronic voting systems that do not involve physical alteration of ballot material by the voter do not provide for voter verification of the correctness of his or her own vote. Current voting systems that do involve physical alteration of ballot material by the voter to effect voting are subject to erroneous or incompetent handling by the voter. When such erroneous or incompetent handling by the voter occurs, the mechanical or electronic means for counting the votes on the ballot are affected, and the ballot may be rejected or the counting

otherwise rendered inaccurate or suspect. The circumstance of ballot rejection or inconsistent mechanical tabulation in the case of erroneous or incompetent handling by the voter often requires manual examination of ballots, which is not only laborious and subject to its own inaccuracies, but is also inherently fraught with difficulty in maintaining the integrity of the election process. The principal object of the present invention is to provide a voter with a printed ballot prepared by a computer station and printer from input by the voter which completely and accurately presents the votes of the voter, and which is in a familiar form for easy review of his or her vote by the voter, so that machine and human error may be detected and corrected before the ballot is finally submitted by the voter for tabulation with the votes of other voters.

There is no prior art that this invention builds upon except its generic relationship to the well-known concept of electronic and mechanical voting machines, including those which produce a permanent paper record in addition to direct electronic and mechanical tabulation. However, there does not appear to be any prior art which combines accurate electronic or mechanical preparation of a printed ballot with an opportunity for review of the ballot by the voter and mechanical or electronic comparison of the printed ballot with the data stored from the voter input.

The present invention has elements that may be considered to be covered generally by class 235, particularly subclass 51 covering machines employed for casting and counting votes.

## BRIEF SUMMARY OF THE INVENTION

The present invention is a voting system and method which provides for auto-verification, auto-verification meaning here the process by which the voter has the opportunity and the responsibility to verify that the ballot with which he or she votes shows the votes as he or she intended. The voting system also provides for correction of the votes of the voter by the voter if the election ballot produced by a computer voting station from his or her voting input does not show the votes as he or she intended, such correction being effected by repeating the voting process and producing another printed ballot. The present invention provides a voter with a printed ballot prepared by a computer voting station with a printer from input by the voter which accurately presents the votes of the voter in a familiar form, and which the voter then submits as

his or her votes.

The present invention employs a computer voting station which is a computer to which a display, an input device, and a printer are connected, and which is running a computer program for directing the voting process for the voter and for vote counting. A ballot scanning machine which is capable of reading ballot selection markings, such as the filled-circle, filled-oval, or filled-rectangle types of voting markings, may also be connected to the voting station. The computer program for the voting system displays the ballot for voting together with instructions for voting and provides for input of votes by the voter. The voter votes by selecting his or her preference in candidates or issue positions by means of an input device recognized by the computer program, and the computer program temporarily stores such vote information in memory or on storage media. A printed ballot produced by the computer voting station which shows the votes of a voter is then presented to the voter and either compared by the voter, or by operation of the computer program for the voting system with a ballot scanning machine, the machine capable of reading ballot selections, with the votes of the voter temporarily stored in the computer. **The result of the comparison is then judged acceptable or unacceptable by the voter, in the case of comparison by the voter, or by the computer program for the voting system, in the case of comparison by the computer for the voting station which is the preferred embodiment, so that only printed ballots which show votes by the voter identical to the votes of the voter stored in the computer voting station will be accepted for final tabulation.** Such final tabulation is then made by a tabulation machine for the precinct.

## DETAILED DESCRIPTION OF THE INVENTION

The present invention is a voting system which provides for auto-verification, auto-verification meaning here the process by which the voter has the opportunity and the responsibility to verify that the printed ballot which he or she finally presents as his or her votes shows the votes he or she intended. The voting system also provides for correction of his or her vote if the printed ballot by which he or she voted is not as he or she intended, such a correction being effected by repeating the operation of the voting station in the voting process. Although the voting system

which is the present invention is complete as the instrument by which an election process may be carried out, the voting process is ultimately founded upon the law which governs elections and therefore the manner in which the voting system is managed and operated. Thus, there may be many variations in the process that will be effective and equivalent in the management and operation of the voting system which is the present invention, and that will produce an accurate count of votes which have been individually verified by the voters themselves.

The principal object of the present invention is to provide a voter with a printed ballot prepared by a voting station with a printer from input from the voter which accurately presents the vote of the voter, and which is in a familiar form for easy review by the voter, so that machine and human error may be detected and corrected before the ballot is submitted by the voter for tabulation with the votes of other voters.

The present invention is a voting system and method which employs a computer voting station which includes a computer to which a display, input device and printer are connected. The computer may be a mainframe, a central computer with terminals, a standard personal computer, or a combination thereof. Such computers may be linked by local area networks or networks linking several locations, or internet, with various types of direct connection, such as digital or acoustical telephonic, fibreoptic, satellite, or microwave. Such computers may have internal memory, such as mainframes and personal computers, or may be terminals, with or without memory independent of the memory of the computer to which they are the operating interface. Such computers may have data storage devices, such as fixed disk drives, or removable media drives, such as floppy drives, optical drives, bernoulli drives, or magnetic hard disk drives, all of which may be internal or external to the computer, depending on the hardware configurations selected. The display devices referred to may include standard visual displays, such as computer cathode ray tube monitors, TFT displays, plasma displays, and liquid crystal displays, and auditory displays, such as speakers and earphones connected to sound wave generating interfaces in the computer. The input devices may include a keyboard, standard or braille for vision impaired voters, a pointing device, such as a computer mouse or trackball, a touchscreen, joysticks, or buttons such as on a video game controller.

The system operates through individual voting stations that are individual computers, such as personal computers, or terminals for a central computer, or a combination thereof, to each of

which is connected a printer with graphics capability. The preferred embodiment of the voting system would use a laser printer with a minimum resolution of 600 by 600 dots per inch, and which is capable of printing a paper ballot on which the selection of votes can be represented by filled-circles or other ballot selection markings, such as filled-ovals or filled-rectangles. Such a paper ballot should closely resemble the ballots normally published in advance of an election to inform the electorate of their choices and to create familiarity with the layout of the ballot. Also connected to the computer voting station may be a machine which is capable of reading ballot selection markings previously described, either directly, through a master computer, or network to which the voting station is connected. Such a machine will hereinafter be referred to as a "ballot scanning machine", and is essentially an electro-optical sensing device from the well-known art under Class 250/599 of the United States Patent Classification System. Such a ballot scanning machine may be interfaced with the computer voting station to scan the paper ballot printed by the printer as voted by the voter. The printed ballot produced by the computer voting station which shows the votes of a voter presented to the voter may either be compared by the voter, or by operation of the computer program for the voting system with a ballot scanning machine, the machine capable of reading ballot selection markings, or by both methods, with the votes of the voter temporarily stored in the computer. The vote stored in the computer is either in memory or on disk, also by operation of the computer program for the voting system running in the computer. The result of the comparison is then judged acceptable or unacceptable by the voter, in the case of comparison by the voter, or by the computer program for the voting system, in the case of comparison by the computer for the voting station, which is the preferred embodiment, so that only printed ballots which show votes by the voter identical to the votes of the voter stored in the computer voting station will be accepted for final tabulation. However, such a comparison may also be made visually or in braille by the voter, without the use of such a ballot scanning machine, resulting in a determination by the voter of the acceptability of the printed ballot with the votes of the voter for final tabulation. Such final tabulation may then be made by a tabulation machine for the precinct, or other legally chosen voting subdivision, which in a preferred embodiment is one which has the same ballot scanning machine mechanism as the ballot scanning machine which scanned the printed paper ballot for comparison with the vote temporarily stored in the voting station memory.

The computer program for the voting system may be running in a master computer of which the voting stations are terminals or locally stored in each computer voting station itself, which may be a stand-alone computer, depending on the hardware configuration chosen to implement the voting system. The computer program by which the voting system is operated, running in the computer for a voting station, functions to cause the computer voting station to display voting information and instructions to the voter, as well as instructions and information as to the operation of the voting system. Such voting instructions may be presented by the program visually or audibly, with various options for languages other than English for selection by the voter, and may include practical and legal warnings about voting and the abuse of the voting right. The type of display, visual or auditory, as would be necessary for voters whose sight was impaired, may be selected by the voter before commencing the operation of the voting station by program selection or by prior arrangement with election officials. Such a selection may be implemented by directing the voter to a voting station specially equipped for the selection, or by an option available in the computer program in appropriately configured computer voting stations.

The computer program also displays the ballot for voting and provides for input of votes by the voter, the type of display again being selected in advance of commencing operation of the voting station. The voter votes by selecting his or her preference in candidates or issue positions by means of the input device provided and recognized by the computer program, and the computer program temporarily stores such voting information in memory or on storage media. The computer program may provide for review and correction of votes during the operation of the voting station by the voter.

Upon or following temporary storage of the vote of the voter by the computer program in the computer for the voting station, the vote of the voter is then presented to the voter in the form of a paper ballot printed by the printer for that voting station, the paper ballot being completed in the printing process by the computer program from the information concerning the vote of the voter stored in memory, such vote being represented on the printed ballot by filled-circles or other ballot selection markings related to the choices of the voter made upon voting. The printed ballot may be produced by the printer by printing the votes of the voter on a pre-printed election ballot, or by printing the votes of the voter concurrently with the printing of the election ballot on the same paper as the election ballot is printed. The printed ballot may be embossed in braille directly

by a braille printer for reading and verification by a sight-impaired voter, or translated and overprinted with the use of a machine using well-known technology for character recognition and braille printing. The voter then has an opportunity to examine the printed ballot for correctness with regard to the preferences expressed by his or her voting. If upon inspection of the printed ballot produced by the printer for the voting station used by the voter, the voter observes that the printed ballot correctly represents the votes of the voter, the ballot may be submitted by the voter for processing to a ballot scanning machine interfaced with that voting station. Such processing may proceed in the computer program by comparison of the votes represented by ballot selection markings on the printed ballot with the votes stored in the computer for the voting station. If the votes shown on the printed ballot are identical to the votes stored in the computer for the voting station, the ballot is returned to the voter for presentation by the voter for final tabulation by one of the tabulating machines for the voting precinct, or other legally chosen voting subdivision, and the vote data which was temporarily stored in the voting station computer is finally stored for processing by the computer program.

A ballot scanning machine may also be programmed through the computer for the voting station to imprint the printed ballot with a validation marking or code which the tabulating machines for the precinct require for acceptance of the printed ballot for tabulation. If the votes of the voter as shown on the printed ballot are not identical to the votes of the voter stored in the computer for the voting station computer, the printed ballot presented to the voter may then be invalidated, which may be evidenced by defacement or other treatment of the ballot, and the ballot may either be returned to the voter for reference, if not destroyed. Such a ballot scanning machine would in a preferred embodiment render such an invalidated ballot unacceptable by the tabulation machines for the precinct, so that the votes on such an invalidated ballot could not be accepted as final votes for tabulation with other votes. The vote information temporarily stored in the voting station computer would then be erased, and not stored for further processing with other final votes stored in the computer for the voting station. Upon the occurrence of such an invalidation of a printed ballot the voting system would become subject to diagnostic review to determine the cause of the discrepancy, which may require the temporary closure of the system. If the hardware configuration permits, only the voting station involved which produced the discrepancy would be shut down for diagnostic review, with the voter being directed to another

voting station to repeat the voting process.

The processing of the individual votes of the voters may include continuous tabulation by inclusion of the vote of the voter in the total of votes cast in selection of the candidates or on the issue positions, database recording of the anonymous voting of each voter, real time read-out of voting information, and continuous comparison with the results of the vote counting by the tabulating machines for the voting precinct. All of the voting activity of the computers, the voting stations, and the tabulations by the voting precinct, or other legally chosen voting subdivision, may be recorded for later review. Such voting activity may also be monitored in real-time, so that if discrepancies appear in the tabulation of the votes cast as shown from the totals available from the computer program for the voting stations and the tabulation of the votes cast by the tabulating machines of the precinct, or other legally chosen voting subdivision, those discrepancies may be brought to the attention of election officials, present to or removed from the precinct, or other legally chosen voting subdivision.